Evaluating Cognitive Presence to Observe Community of Inquiry Forming Process

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ABSTRACT

Community of Inquiry is a community formed in blended learning. One aspect of the inquiry community is cognitive presence. Cognitive presence shows that there is a cognitive process that occurs in students who take part in blended learning. This research is a qualitative descriptive study conducted on 30 chemistry students in the third year. This research was conducted using cognitive presence observation sheets from each phase of the community of inquiry. Cognitive presence phases are triggering events, exploration, integration, and application. The results show that blended learning had been carried out in forming process of community of inquiry. The triggering event phase is carried out at the initial face-to-face meeting. Students begin to get an initial overview of the material. In addition students get material and discussion topics to be studied. At the exploratio stage students discuss in small groups simultaneously. The integration phase is carried out during class discussions between students and teachers in e-learning forums. The application phase is carried out at the end of learning as indicated by the development of research designs by students.

INTRODUCTION

Advanced technology affects many aspects in education especially in online learning. Awareness of interactions and engaged learning in line with the potential of the internet and technology to connect students¹¹. An extensive internet network causes students to have a great opportunity to participate in online learning. Online learning is widely available on the internet. The use of online learning are increased because online learning is not dependent on a particular time and place. Students can study according to
their wishes. The college also provides online learning in accordance with the courses taken by student. Online learning can be done in full online or combined with offline learning.

Combination of online and offline learning, commonly called blended learning, are also considered to use in classroom. Blended learning combines elements of face to face and online that can occur in various activities, learning, program, or administrative level \(^2\). Offline learning are chance to review content and build same perception with student. Student also can present their analysis or finding when offline learning are taken. Student and lecture discussion are more flexible in online learning because it is not limited to place and time \(^3\). Blended learning supports collaborative learning (Agosto, et al., 2013). Flexible time and place gives more chance to interaction of student-student and also student-lecture. It also give chance to a wider and deeper discussion about content.

Participation and interaction are important in online learning. Interaction is an element of true collaboration besides participation and synthesis \(^2\). Interaction in learning increases high order thinking skills, students understanding and retention \(^4\)\(^5\)\(^6\). The use of forums and wikis in online learning has the potential to facilitate the interaction of participants and group activities in a web-based learning environment, and allow students to share their ideas and discuss \(^7\) so as to increase interaction between students is increased compared to traditional classes \(^8\). Increased interaction can help run the community of inquiry which is the core of the learning process.

Community of inquiry is a way for students to obtain learning outcomes. Community of inquiry is essentially social constructivist, involves deep and meaningful learning through interactions between students and students and educators using computers \(^9\). Community of inquiry that supports connection and collaboration between students and build learning environments \(^1\).

Community of inquiry can be described as a model where each element supports other elements. Three elements within the Community of inquiry framework are social presence, cognitive presence, and teaching presence. Each attendance shows the categories or indicators that run the elements used for research and design of teaching and learning transactions. Thing that needs to be noted that there is interdependence between each presence. Social presence is related to how students in the Community of inquiry can express themselves openly. Indicators of social presence are learning satisfaction and interaction. Cognitive presence moves progressively from the triggering event phase to the resolution phase of Community of inquiry learning. This is the core of the cognitive process and is an important key in the Community of inquiry framework.

**METHODOLOGY**

This research conducted in third year student in NMR topic in analytical chemistry course. Course are conducted in blended learning. This research are focused to describe how cognitive presence are forming in community of inquiry. Data obtained from transcripts of online class discussions. Other data is their worksheet answer that contain their research design that use NMR combined with another analytical method. Data is analysed to match indicators of each phase of cognitive presence.
Cognitive process in Community of Inquiry has three phases which are triggering event, exploration, integration, and resolution\cite{10}. Cognitive presence is the basis of the inquiry process\cite{1}. Indicators of each phases are listed below.

**Table 1. Indicators of each phase in cognitive presence\cite{11}**

<table>
<thead>
<tr>
<th>Phase</th>
<th>Indicators</th>
</tr>
</thead>
<tbody>
<tr>
<td>triggering event</td>
<td>Sense of puzzlement,</td>
</tr>
<tr>
<td></td>
<td>Recognize problems</td>
</tr>
<tr>
<td>exploration</td>
<td>Information exchange,</td>
</tr>
<tr>
<td></td>
<td>Divergence, Suggestions,</td>
</tr>
<tr>
<td></td>
<td>Brainstorming, Intuitive leaps</td>
</tr>
<tr>
<td>integration</td>
<td>Connecting ideas, Applying new ideas, Solutions,</td>
</tr>
<tr>
<td></td>
<td>Synthesis</td>
</tr>
<tr>
<td>resolution</td>
<td>Apply, Test, Defend</td>
</tr>
</tbody>
</table>

*source: Alavi & Taghizadeh, 2013*

**RESULT AND DISCUSSION**

A. **Triggering Event**

The triggering event phase is carried out at the initial face-to-face meeting. At this meeting students are given an overview of the topics to be studied. In addition students are given material and discussion topics to be studied in inquiry. Lecturer designs the material according to the boundaries and depth. The material can be accessed at e-learning. The material provided in the form of videos, textbooks, and articles in accordance with the sub topics being discussed.

Indicators of triggering event are sense of puzzlement and recognize problems. Student can ask questions about what they are still confused. Sense of puzzlement is indicated by these questions. Recognize problems is indicated by topic of the question. These questions are not too far from the boundaries. It is indicated that student recognize what problems that they have to solve.

B. **Exploration**

The exploration phase is carried out by encouraging students to discuss in small groups asynchronously. Small group discussions are carried out on the whatsapp group. Students are given student worksheets that contain questions to discuss, but are still collected individually.

Indicators of exploration are Information exchange, Divergence, Suggestions, Brainstorming, Intuitive leaps. Information exchange is indicated by e-learning discussion transcript. Interactions are happen between student and student-lecture. This interaction shows an information exchange. The example is given below.

LECTURER : What protons produce when spinning?.................................
(a)
STUDENT (1): angular moment...........................................................
(b)
STUDENT (2): moment ...........................................................................
(c)
LECTURER : But there is another answer.............................................
(d)
STUDENT (3): is there a magnetic field?…………………………………………………
(e)
STUDENT (4): magnetic field…………………………………………………………..
(f)
STUDENT (5): strong magnetic field ………………………………………………..
(g)
Divergence are showed by several kinds of answer given by student. Suggestions is
indicated by lecturer (d) suggest that student have to give another answer. Student also
give another answer suggestion (e) that different from before. Brainstorming is also
indicated by lecturer (d). It (d) encourages student to give another answer. Intuitive
leaps are not shown.

a. Integration

The integration phase is carried out during class discussions at e-learning
forums. Students have the opportunity to express their understanding of the given topic.
The educator acts as a facilitator in charge of organizing class discussions. Educators
are also tasked to improve student understanding.

Indicators of integration are connecting ideas, applying new ideas, solutions, and
synthesis. The example is given below.

LECTURER: Whats the function of probe sample? ………………………………
(h)
STUDENT (1): to place the sample precisely in the sample place …………………
(i)
STUDENT (2): correctly place the sample in the magnetic field. The sample
probe
consists not only of the sample chamber but also the FR generator coil,
the FR oscillator coil and the FR detector coil……………………………………
(j)
STUDENT (3): Is it an additional equipment to help modern instrumentation?…
(k)
STUDENT (2): Is it really additional? …………………………………………………
(l)
LECTURER: The probe is essentially additional equipment, well this is located
in the area where the sample is. The probe is not just for placing
the sample tube.
…………………………………………………………………………………………(m)

Connecting ideas can be seen from how they manage their understanding and express it in
e-learning discussion as expressed in (i) and (j). There is no part of applying new
ideas in this example. Solutions is indicated by (k) by STUDENT (3) giving new
answer which is different from what others expressed. Synthesis is indicated by
LECTURER in (m). (m) is synthesized from what student discussed about probe
sample.

b. Resolution

Resolution phase is done at the end of learning. In this phase students are asked
to understand a research journal about NMR material and then design an experiment in
accordance with the understanding they have.
Indicators of resolution are apply, test, and defend. Students are apply their understanding about NMR analytical method by design a research based on journal. They design after understand a few journal that chosen by lecturer. They also have essay test about NMR. Defend is not to be seen in this phase.

CONCLUSION
Cognitive presence are seen in e-learning analytical chemistry course. It can be indicated from indicators in every phase. Triggering event phase is done in the initial meeting. Sense of puzzlement and recognize problems are seen on triggering event phase. Information exchange, divergence, suggestion, and brainstorming are seen on integration phase. Applying understanding and test are in resolution phase.

REFERENCES


